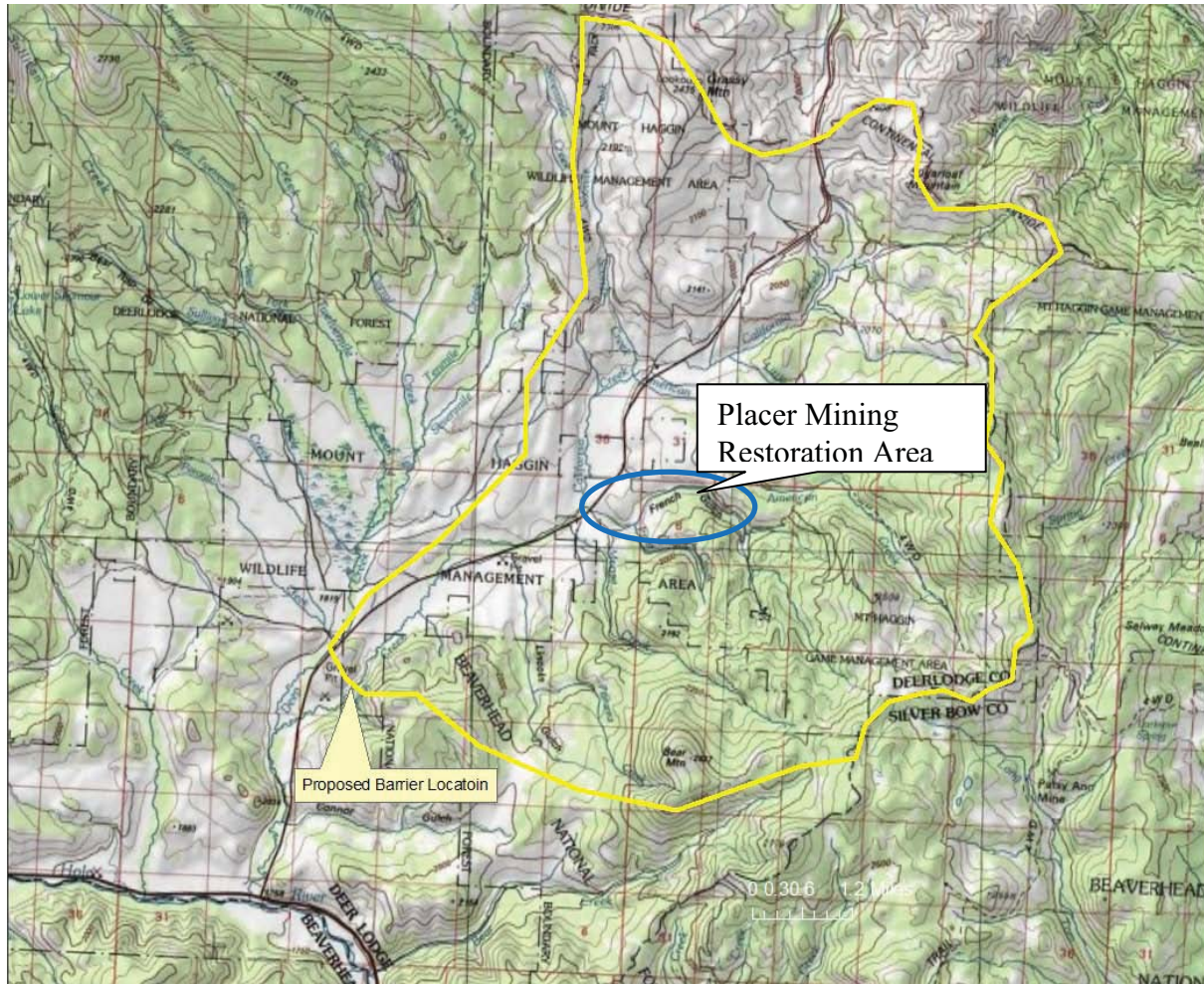


**FUTURE FISHERIES IMPROVEMENT PROGRAM  
GRANT APPLICATION***(please fill in the highlighted areas)***I. APPLICANT INFORMATION**A. Applicant Name: Jim OlsenB. Mailing Address: 1820 Meadowlark LaneC. City: Butte State: MT Zip: 59701Telephone: 533-8451D. Contact Person: Same as aboveAddress if different from Applicant: City:  State:  Zip: Telephone: E. Landowner and/or Lessee Name  
(if other than Applicant): Montana Fish, Wildlife and Parks, Mt Haggin WMAMailing Address: City:  State:  Zip: Telephone: **II. PROJECT INFORMATION\***A. Project Name: French Gulch Placer Mining ReclamationRiver, stream, or lake: French CreekLocation: Township 2N Range 12W Section 1County: DeerlodgeB. Purpose of Project:  
Restore habitat impacted by past placer mining in the lower 3 miles of French Gulch.

C. Brief Project Description

The overarching goal of this project is to restore the native fish assemblage and habitat in French Creek, a tributary to Deep Creek and the Big Hole River. The French Creek drainage lies on lands owned and managed by FWP (Mount Haggin Wildlife Management Area), US Forest Service and BLM. The project proposed in this application is the restoration of placer

mined reaches of French Gulch (Map 1). French Gulch was the first gold strike in the Big Hole River drainage in the 1860's. Placer mining occurred in the drainage through the early 1900's. More than 5 miles of stream have been impacted to varying degrees by placer mining practices resulting in a straightened stream channel, the presence of large dredge spoils, increased stream gradient, reduced riparian area width and isolation of the stream from its floodplain. The straightened channel has resulted in poor fish habitat dominated by riffles with few pools and spawning gravels and a limited riparian area (Figure 1). French Gulch likely served as an important spawning and rearing tributary to French Creek prior to mining. Further, the straight channel and lack of a floodplain increases fine sediment erosion and transportation to French Creek downstream. In some reaches of the stream large gravel spoils pile have become vegetated by upland species such as sage brush and lodgepole pine which have replaced the former riparian vegetation. The goal of this project is to restore stream and floodplain function to the lower 3 miles of French Gulch impacted by placer mining activities.



Map 1. French Creek watershed (outlined in yellow) and the French Gulch Mining area (circled in blue) located approximately 20 miles south of Anaconda.



006-2015



French Gulch channel relocation

Figure 1. Photos of Priority Restoration Reach 2 with the most severe placer mining impacts. Riparian area is very limited and stream is eroding sediments from dredge piles and adjacent hill slopes.



A planning grant was obtained by the Deerlodge Valley Conservation District from the DNRC Reclamation and Development Grant Program for the development of a design to restore French Gulch. Morrison and Maierle Inc. were contracted in 2013 to develop the restoration design. Five Restoration Areas were identified in the lower 3 miles of stream to have full stream channel and floodplain restoration and there is a total of 8,076 ft of stream in these reaches (see attached 80% Engineering Drawings) slated for restoration. These areas were identified as the most impacted and the ones that could provide the greatest benefit to aquatic and riparian habitat if they were restored. Restoration Areas 1 and 2 consist of the most severely impacted reaches of French Gulch in the lower 3 miles (See Figure 1). In these reaches of stream there are large gravel piles (> 6 ft) that severely restrict the stream and floodplain. Restoration in these high priority areas would have the greatest benefit to stream and floodplain function. There are 6,132 ft of stream that would be restored in Restoration Reaches 1 and 2. Restoration areas 3-5 are in reaches of stream with fewer remaining visible impacts of placer mining (i.e., the area lacks large piles of gravel restricting the floodplain). However, the stream in this reach is straight and lacks pool features. The riparian area in this reach is also well established because of the lack of large dredge piles, but the fisheries habitat is poor due to the lack of pools and preponderance higher gradient riffles (see attached Geomorphic Memo). The Restoration Areas in this upper reach are generally shorter (1,944 ft total) and involve less removal of material to establish a more sinuous stream channel and functioning floodplain.

The general approach for restoration in identified Restoration Areas will be to reconstruct a floodplain and stream channel within this floodplain and divert the stream into this newly created habitat and plug the old channel once construction is complete (see attached 80% Design Sheets). The newly constructed stream channel would be vegetated using 2 principal methods. First native vegetation (i.e., sod mats and mature willow plants) would be transplanted to establish stream banks on approximately 30% of reconstructed stream reaches. These materials will be collected from the existing stream banks or other areas in or adjacent to French Gulch. Using existing plants will jumpstart the revegetation of the constructed stream banks and floodplain. The other 70% of stream banks would receive a bioengineered treatment. These banks of the stream would be constructed using a coir fabric wrapped soil lift planted with native grasses and sedges and willow stakes (See attached 80% plan drawings, sheet D-1). In addition to these 2 techniques, there are areas in Restoration Areas 1 and 2 where the channel would be relocated to areas that have a more intact floodplain with existing riparian vegetation. In these areas only minor excavation would be required to establish a stream channel and floodplain and there would be no need to perform extensive riparian plantings because adequate riparian vegetation already exists. In Restoration Areas 1 and 2 leveling of gravel piles in the upland areas away from the newly created stream and floodplain will be limited due to the requirement to preserve the historical significance of the area. Additional habitat enhancements would be made to reaches of the stream not in the Restoration Areas 1-5 that were less impacted by mining or that have recovered but still lack diversity of aquatic habitat. In these areas, minor improvements would be made such as pool enhancement, the addition of woody debris and minor channel changes. This work would be done primarily by hand crews or the use of small machinery such as spider or mini excavator to limit the impacts on existing vegetation. In addition to completing the work in Restoration Areas 1-5, the culvert at the head of the project area would be removed and replaced with step pool structures (See 80% Design Sheet C8). The stream channel work in Restoration Reach 2 also includes relocating a section of the road out of the floodplain to the north to allow for floodplain restoration.

The French Creek watershed has been impacted substantially by factors other than placer mining. The French Gulch placer mining restoration is part of a larger watershed restoration project to restore the impacts of various activities in the drainage including mining, smelting, logging, grazing and non-native species introduction. Atmospheric deposition of metals and SO<sub>2</sub> from the Anaconda smelting operations have resulted in significant erosion in the headwaters of California Creek, a tributary to French Creek. Past logging and grazing practices have also

significantly affected the landscape. Projects are currently underway to restore the areas affected by these practices. The Big Hole Watershed Committee who is a partner on this project has secured funds to support the reduction of sediment and wetland restoration in California Creek in partnership NRDP beginning in 2014 which is expected to reduce sediment loading to the stream. Grazing practices are being altered resulting in improved riparian conditions and logging is done in more sustainable manner. A 2-mile section of Highway 569 is being relocated by the Montana Department of Transportation from the riparian area of French Creek immediately downstream of French Gulch to an adjacent upland area away from the stream. The relocation of the highway will allow us to relocate the existing crossing of French Gulch under the highway from an area heavily impacted by placer tails to an adjacent area with a more intact floodplain. A native fish project is also scheduled for the drainage where native Arctic grayling and westslope cutthroat trout would be restored to the entire French Creek drainage (38 miles of stream, FFIP funded the fish barrier in 2013). As these projects proceed and stream habitat conditions and water quality improve, it is expected that the fishery in French Creek will improve dramatically. French Creek will be the largest intact native fish assemblage in the Big Hole drainage and the second largest in the upper Missouri River.

D. Length of stream or size of lake that will be treated:

8,076 ft

E. Project Budget:

**Grant Request (Dollars):** \$ **\$200,000**

Contribution by Applicant (Dollars): \$ In-kind \$  
(salaries of government employees are not considered as matching contributions)

Contribution from other Sources (Dollars): \$ **\$864,294**  
(attach verification - See page 2 budget template)

In-kind \$

**Total Project Cost:** \$ **\$1,053,961**

F. Attach itemized (line item) budget – see template

G. Attach specific project plans, detailed sketches, plan views, photographs, maps, evidence of landowner consent, evidence of public support, and/or other information necessary to evaluate the merits of the project. If project involves water leasing or water salvage complete supplemental questionnaire ([fwp.mt.gov/habitat/futurefisheries/supplement2.doc](http://fwp.mt.gov/habitat/futurefisheries/supplement2.doc)).

H. Attach land management and maintenance plans that will ensure protection of the reclaimed area.

### III. PROJECT BENEFITS\*

A. What species of fish will benefit from this project?:

Westslope cutthroat trout and Arctic grayling

B. How will the project protect or enhance wild fish habitat?:

The French Gulch project will enhance highly degraded habitat resulting from past placer mining activities. Placer mining has resulted in a straightened and confined stream channel. The newly constructed channel will have a functioning floodplain with a lower gradient and more sinuous channel. The lower gradient and more sinuous channel will allow for deposition of spawning sized gravels and the creation of spawning areas. Further the new sinuous channel will have self-maintaining pools which are severely lacking in mining impacted reaches. A functioning floodplain will allow the stream to naturally migrate back and forth through time which will aid in natural stream function and aquatic habitat creation and maintenance. Currently the stream channel is "locked" into its configuration because of the large gravel spoil piles. It is likely that once the habitat in the stream is restored it could harbor double the number of fish it currently contains and the stream would also become an important spawning and rearing tributary for fluvial cutthroat trout and Arctic grayling from French Creek.

C. Will the project improve fish populations and/or fishing? To what extent?:

This project could potentially double the amount of trout and/or grayling in French Gulch. Because of the severely degraded habitat and lack of pools, the fishery in French Gulch is limited. Once the habitat is restored and the number and quality of pools and spawning habitat dramatically improved, the numbers of fish in the stream should increase dramatically. Also, if fluvial fish from French Creek move into French Gulch to spawn, the fishery in the mainstem creek could also benefit. Further, the entire project is located on the Mount Haggin Wildlife Management Area and is very accessible to anglers.

D. Will the project increase public fishing opportunity for wild fish and, if so, how?:

The public currently has unrestricted opportunity to fish in French Gulch and French Creek. The public will see improved fishing in the stream once the project is complete and the fish have colonized the new higher quality habitat.

E. If the project requires maintenance, what is your time commitment to this project?:

There is the potential for maintenance if a large scale flow event occurs within the first 2-3 years after the habitat is constructed and while permanent vegetation becomes established. A large flood could result in the erosion of the newly constructed channel. To mitigate for this possibility we have employed 2 different techniques for re-establishing stream banks in the newly created channel. One (native sods) which would use transplanted material to form the stream banks and the other is a bioengineered bank with coir fabric and willow cuttings. It is likely that transplanted vegetation will become rooted more quickly than willow cuttings and seeded vegetation but the coir wrapped soil lifts also provide a measure of protection from erosion in high flows. It is our intent to use soft techniques to establish the new banks of the stream so that through time the stream is deformable and able to adjust through time. Using these 2 techniques we hope to reduce the risk of catastrophic failure of the reconstructed channel if a large scale flood occurs within the first year or two after construction. With a newly formed floodplain and access of this floodplain to ground water it is anticipated that natural vegetation will quickly become established. While such a flood even would be devastating over the short term, the restoration of a functioning floodplain will allow the stream to establish a more appropriate stream channel with meander bends and pools on its own, which is not currently possible due to the placer mining spoil piles.

F. What was the cause of habitat degradation in the area of this project and how will the project correct the cause?:

The cause of habitat degradation in the area is placer mining for gold. Phillip and Nelson Bissonett discovered gold at French Creek in 1864, and a typical gold rush ensued. The first placers were worked in the lower two and a half miles of French Gulch in 1864. During the early years of placer mining, the work done in French gulch was with pans, rockers and small sluices which is why some reaches of the stream have fewer visible impacts today of mining other than a straightened stream channel. By the 1880s the active claims had about 15 feet of gravel to be removed to get to bedrock where the best deposits were. Also starting in the 1880s, bars (benches) up to 50 feet above the drainage were first worked with hydraulic methods. Ditches were engineered to deliver water from nearby Moose, First Chance, French and American creeks to create sufficient head pressure to work several hydraulic giants with 3 inch nozzles and an Evans Hydraulic Elevator. In the upper gulch, upstream of the proposed restoration area, a steam hoist or "Donkey" and derrick were employed raising and moving boulders out of the way. In 1900 the Allen Gold Mining Company added a floating dredge to French Creek which consisted of a boat or scow with appliances for digging and elevating material in front of it, sorting and washing it, collecting the gold and discharging the waste or tailing to the rear of the boat. Placer mining was more or less continuous, at varying scales and by various methods, from 1864 to 1911.

All of the stream gravels from the head of the gulch to the confluence with French Creek were mined down to the bedrock. The drainage bottom currently can best be described as a series of gravel piles, trenches and bars through which the creek meanders and bifurcates. Seasonal run off has leveled off the placer tails in some areas, while large, linear dredge piles remain in the margins of the lower half of the project corridor. Adjacent slopes, mined by hydraulic giants, have experienced tremendous erosion. Two hard rock mines were also in operation at the headwaters of the drainage at French Town until the early 1900's. The Anaconda Copper Company owned the proposed project area until FWP ownership in 1976.

FWP owns the mineral rights as well as the land on the Mt. Haggin Wildlife Management Area so there is not threat of future placer mining in the area. Recreational gold panning still occurs in the stream but it is unlawful to dig any material from banks or uplands.

The proposed project will restore a functioning floodplain and channel to the placer mined reaches of the lower 3 miles of French Gulch. While it is not possible to restore the entire valley bottom to pre-mining conditions because of both historical concerns and financial infeasibility, we feel the approach proposed herein provides the largest potential benefit while balancing impacts to cultural resources and economic concerns.

G. What public benefits will be realized from this project?:

Montanans will directly benefit from this project through the restoration of aquatic and riparian habitat that belongs to them. Mount Haggin is a state owned Wildlife Management Area. The natural resource damage that occurred in the French Gulch drainage occurred many decades before state ownership. The goals of the Wildlife Management Area are to conserve critical wildlife habitat for use by the hunters, angler and recreationists of Montana. The habitat in French Gulch has been severely degraded by past mining and this restoration will repair, to the extent practicable, the impacts that have not naturally healed. Once restored the landscape will more closely reflect conditions prior to mining while still preserving some mining features of the area that reflect the historical use of the drainage and improved habitat will lead to improved fish and other wildlife populations. It is anticipated that the fish population in French Gulch could double with improvements in stream habitat. It is also anticipated that migratory fish from French Creek will use the stream for spawning and rearing and therefore, the fish population and fishing will improve in French Creek as well. Westslope cutthroat trout and Arctic grayling are slated to be restored to the French Creek drainage including French Gulch. Both species are species of concern in Montana and have been petitioned for listing under the Endangered Species Act. Large scale restoration projects such as the French Creek watershed project will aid in conserving these species and lessen the chances that they will warrant listing as a Threatened or Endangered Species and preventing the listing of these species will benefit all Montanan's.

Wildlife habitat will also improve as a result of the restoration of the riparian area. This will benefit multiple species such as moose, elk, deer and bear which are game species and many non-game species as well. Opportunities for Montanans to observe and in some cases harvest these animals will be increased though the restoration of French Gulch.

H. Will the project interfere with water or property rights of adjacent landowners? (explain):

No, the entire project is located on public property (FWP Mt Haggin Wildlife Management Area).

I. Will the project result in the development of commercial recreational use on the site?: (explain):

No.

J. Is this project associated with the reclamation of past mining activity?:

Yes.

**Each approved project sponsor must enter into a written agreement with the Department specifying terms and duration of the project.**

#### **IV. AUTHORIZING STATEMENT**

I (we) hereby declare that the information and all statements to this application are true, complete, and accurate to the best of my (our) knowledge and that the project or activity complies with rules of the Future Fisheries Improvement Program.

Applicant Signature:

Date:

Sponsor (if applicable):



**\*Highlighted boxes will automatically expand.**

**Mail To: Montana Fish, Wildlife & Parks  
Habitat Protection Bureau  
PO Box 200701  
Helena, MT 59620-0701**

**Incomplete or late applications will be returned to applicant.**

**Applications may be rejected if this form is modified.**

**\*\*\*Applications may be submitted at anytime, but must be received by the Future Fisheries Program office in Helena before December 1 and June 1 of each year to be considered for the subsequent funding period.\*\*\***

**BUDGET TEMPLATE SHEET FOR FUTURE FISHERIES PROGRAM APPLICATIONS**  
(Revised 11/25/2014)

WORK ITEMS (ITEMIZE BY CATEGORY)	NUMBER OF UNITS	UNIT DESCRI PTION*	COST/UN IT	TOTAL COST	CONTRIBUTIONS			
					FUTURE FISHERIES REQUEST	IN-KIND SERVICES	IN-KIND CASH	TOTAL
<b><u>Personnel</u></b>								
Survey								\$ -
Design				\$ 36,902.00	5,602.00		31,300.00	\$ 36,902.00
Engineering								\$ -
Permitting				\$ -				\$ -
Oversight				\$ 49,572.00	2,000.00		47,572.00	\$ 49,572.00
Labor (Deerlodge CD)				\$ 15,000.00			15,000.00	\$ 15,000.00
Const Mgt				\$ 12,539.00	1,000.00		11,539.00	\$ 12,539.00
<b><u>Travel</u></b>								
Mileage				\$ -				\$ -
Per diem				\$ -				\$ -
<b><u>Construction Materials</u></b>								
Restoration Reach 1				\$ 223,829.00	40,000.00		183,829.00	\$ 223,829.00
Restoration Reach 2				\$ 441,065.00	141,065.00		300,000.00	\$ 441,065.00
Restoration Reach 3				\$ 32,080.00	10,333.00		21,747.00	\$ 32,080.00
Restoration Reach 4				\$ 97,287.00			97,287.00	\$ 97,287.00
Restoration Reach 5				\$ 78,293.00			78,293.00	\$ 78,293.00
Culvert Removal				\$ 25,938.00			25,938.00	\$ 25,938.00
Habitat Improvement Areas				\$ 41,456.00			41,456.00	\$ 41,456.00
				\$ -				\$ -
				\$ -				\$ -
<b><u>Equipment</u></b>								
				\$ -				\$ -
				\$ -				\$ -
				\$ -				\$ -
				\$ -				\$ -
<b><u>Mobilization</u></b>								
Mobilization and Demob const included in each reach task								\$ -
Contingency also included in each task								\$ -
				\$ -				\$ -
				\$ -				\$ -
				\$ -				\$ -
				<b>TOTALS</b>	\$ 208,000.00	\$ -	\$ 853,961.00	\$ 1,053,961.00
					Page 1 of 2			
					\$			

BUDGET TEMPLATE SHEET FOR FUTURE FISHERIES PROGRAM APPLICATIONS  
(Revised 11/25/2014)

\*Units = feet, hours, inches, lump sum, etc.

MATCHING CONTRIBUTIONS

CONTRIBUTOR	IN-KIND	CASH	TOTAL
Reclamation Development Grant (pending)	\$ -	\$ 500,000.00	\$ 500,000.00
FFIP	\$ -	\$ 200,000.00	\$ 200,000.00
DEQ 319 Grant (secure)	\$ -	\$ 225,000.00	\$ 225,000.00
WNTI	\$ -	\$ 15,000.00	\$ 15,000.00
In-kind labor	\$ 12,500.00		\$ 12,500.00
George Grant TU		\$ 5,000.00	\$ 5,000.00
Skyline Sportmen		\$ 3,000.00	\$ 3,000.00
MT Trout Foundation		\$ 4,000.00	\$ 4,000.00
US FWS Fish Passage Program		\$ 35,000.00	\$ 35,000.00
State Wildlife Grants	\$ -	\$ 20,000.00	\$ 20,000.00
Bring Back the Natives (NFWF)		\$ 15,000.00	\$ 15,000.00
State Wildlife Grants	\$ -	\$ 20,000.00	\$ 20,000.00
Total	\$ -	\$ -	\$ 1,054,500.00





French Creek Restoration Wetland and Waters of the U.S. Mapping	DRAWN BY: GH CHK'D BY: GH APPR. BY: DATE: 05/07/14	
	PROJECT NO. 5002.004	
0 500 1,000 Feet		FIGURE NUMBER FIGURE 1
3110 Palmer Street Missoula, MT 59808 Phone: (406) 542-4815		
 MORRISON MAIERLE, INC. An Employee-Owned Company		
Engineers Surveyors Scientists Planners		
R:\5002\004\GIS\Wetlands\French_gulch_wetlands.mxd		



### ENGINEER'S OPINION OF PROBABLE COST\*

Date: 5/14/2014  
 Project #: 5002.004  
 Project Name: French Gulch Restoration  
 Engineer: M. Barnes, G. Howard, R. Anderson

#### French Creek - Restoration Area 1

Item No.	Description	Estimated Quantity	Unit	Unit Price	Total Cost
101	Taxes, Bonds, and Insurance	1	LS	\$10,000	\$10,000
102	General Requirements	1	LS	\$10,000	\$10,000
103	Mobilization/Demobilization	1	LS	\$15,000	\$15,000
104	Water & Dust Control	1	LS	\$2,500	\$2,500
105	Erosion Control (Owner to prepare and administer SWPP if needed)	1	LS	\$5,000	\$5,000
106	Clearing and Grubbing	2	AC	\$7,000	\$14,000
107	Excavation & Embankment - Floodplain Shaping	4700	CY	\$5	\$23,500
108	Stream Channel Work	1843	LF	\$4	\$7,679
109	Stream Banks - Fabric Wrap (80% of outer bends)	1474	LF	\$42	\$61,908
110	Stockpile & Install - Wood Structure (1 per 25' of new channel)	74	EA	\$150	\$11,100
114	Collect - Willow Stakes (4 stakes / Ln. Ft. of streambank)	1290	LF	\$5	\$5,805
115	Organic Material/Topsoil - Strip/Stockpile/Place (top 6 inches)	2	AC	\$4,000	\$8,000
116	Seed/Mulch - Floodplain Areas	1.5	AC	\$600	\$900
117	Seed - Wetland/Streambank Areas	1	AC	\$800	\$800
118	Plant/Install - Wetland (100% of area)	1	LS	\$2,694	\$2,694
119	Plant/Install - Streambank (60% of area)	1	LS	\$8,708	\$8,708
120	Plant/Install - Floodplain (40% of area)	1	LS	\$15,887	\$15,887

SUB-TOTAL \$203,481

CONTINGENCY 10% \$20,348

**CONSTRUCTION TOTAL \$223,829**

\* This construction cost estimate does not include technical costs for final design and construction observation. Costs are based on 80% preliminary designs.





### ENGINEER'S OPINION OF PROBABLE COST\*

Date: 5/14/2014  
 Project #: 5002.004  
 Project Name: French Gulch Restoration  
 Engineer: M. Barnes, G. Howard, R. Anderson

#### French Creek - Restoration Area 2

Item No.	Description	Estimated Quantity	Unit	Unit Price	Total Cost
201	Taxes, Bonds, and Insurance	1	LS	\$10,000	\$10,000
202	General Requirements	1	LS	\$10,000	\$10,000
203	Mobilization/Demobilization	1	LS	\$20,000	\$20,000
204	Water & Dust Control	1	LS	\$2,500	\$2,500
205	Erosion Control (Owner to prepare and administer SWPP if nece	1	LS	\$5,000	\$5,000
206	Clearing and Grubbing	2.5	AC	\$7,000	\$17,500
207	Excavation & Embankment - Floodplain Shaping	7500	CY	\$5	\$37,500
208	Stream Channel Work	4300	LF	\$4	\$17,200
209	Stream Banks - Fabric Wrap (80% of outer bends)	3426	LF	\$42	\$143,892
210	Stockpile & Install - Wood Structure (1 per 25' of new channel)	171	EA	\$150	\$25,650
214	Collect - Willow Stakes (4 stakes / Ln. Ft. of streambank)	2997	LF	\$4	\$11,988
215	Organic Material/Topsoil - Strip/Stockpile/Place (top 6 inches)	2.5	AC	\$4,000	\$10,000
216	Seed/Mulch - Floodplain Areas	1	AC	\$600	\$600
217	Seed - Wetland/Streambank Areas	1	AC	\$800	\$800
218	Plant/Install - Wetland (100% of area)	1	LS	\$2,694	\$2,694
219	Plant/Install - Streambank (% of area)	1	LS	\$15,887	\$15,887
220	Plant/Install - Floodplain (% of area)	1	LS	\$14,757	\$14,757
221	Road Reconstruction	1100	LF	\$50	\$55,000


SUB-TOTAL \$400,968

CONTINGENCY 10% \$40,097

**CONSTRUCTION TOTAL \$441,065**

\* This construction cost estimate does not include technical costs for final design and construction observation. Costs are based on 80% preliminary designs.





**MORRISON  
MAIERLE, INC.**

3011 Palmer Street      Ph: (406) 542-8880  
Missoula, Montana 59808      Fax: (406)-542-4801

### ENGINEER'S OPINION OF PROBABLE COST\*

Date: 5/14/2014  
 Project #: 5002.004  
 Project Name: French Gulch Restoration  
 Engineer: M. Barnes, G. Howard, R. Anderson

#### French Creek - Restoration Area 3

Item No.	Description	Estimated Quantity	Unit	Unit Price	Total Cost
301	Taxes, Bonds, and Insurance	1	LS	\$1,500	\$1,500
302	General Requirements	1	LS	\$1,500	\$1,500
303	Mobilization/Demobilization	1	LS	\$1,500	\$1,500
304	Water & Dust Control	1	LS	\$2,500	\$2,500
305	Soil & Erosion Control	1	LS	\$5,000	\$5,000
306	Clearing and Grubbing	0.2	AC	\$7,000	\$1,400
307	Excavation & Embankment - Floodplain Shaping	250	CY	\$5	\$1,250
308	Stream Channel Work	250	LF	\$4	\$1,000
309	Stream Banks - Fabric Wrap (80% of outer bends)	164	LF	\$42	\$6,888
310	Stockpile & Install - Wood Structure (1 per 25' of new channel)	8	EA	\$150	\$1,200
314	Collect - Willow Stakes (4 stakes / Ln. Ft. of streambank)	144	LF	\$5	\$648
315	Organic Material/Topsoil - Strip/Stockpile/Place (top 6 inches)	0.2	AC	\$4,000	\$800
316	Seed/Mulch - Floodplain Areas	0.1	AC	\$600	\$60
317	Seed - Wetland/Streambank Areas	0.15	AC	\$800	\$120
319	Plant/Install - Streambank (75% of area)	1	LS	\$1,970	\$1,970
320	Plant/Install - Floodplain (80% of area)	1	LS	\$1,828	\$1,828

SUB-TOTAL \$29,164

CONTINGENCY 10% \$2,916

**CONSTRUCTION TOTAL \$32,080**

\* This construction cost estimate does not include technical costs for final design and construction observation. Costs are based on 80% preliminary designs.



### ENGINEER'S OPINION OF PROBABLE COST\*

Date: 5/14/2014  
 Project #: 5002.004  
 Project Name: French Gulch Restoration  
 Engineer: M. Barnes, G. Howard, R. Anderson

#### French Creek - Restoration Area 4

Item No.	Description	Estimated Quantity	Unit	Unit Price	Total Cost
401	Taxes, Bonds, and Insurance	1	LS	\$5,000	\$5,000
402	General Requirements	1	LS	\$5,000	\$5,000
403	Mobilization/Demobilization	1	LS	\$5,000	\$5,000
404	Water & Dust Control	1	LS	\$2,500	\$2,500
405	Soil & Erosion Control	1	LS	\$5,000	\$5,000
406	Clearing and Grubbing	0.5	AC	\$7,000	\$3,500
407	Excavation & Embankment - Floodplain Shaping	1000	CY	\$5	\$5,000
408	Stream Channel Work	1100	LF	\$4	\$4,400
409	Stream Banks - Fabric Wrap (80% of outer bends)	880	LF	\$42	\$36,960
410	Stockpile & Install - Wood Structure (1 per 25' of new channel)	44	EA	\$150	\$6,600
414	Collect - Willow Stakes (4 stakes / Ln. Ft. of streambank)	770	LF	\$5	\$3,465
415	Organic Material/Topsoil - Strip/Stockpile/Place (top 6 inches)	0.5	AC	\$4,000	\$2,000
416	Seed/Mulch - Floodplain Areas	0.1	AC	\$600	\$60
417	Seed - Wetland/Streambank Areas	0.2	AC	\$800	\$160
419	Plant/Install - Streambank (75% of area)	1	LS	\$1,970	\$1,970
420	Plant/Install - Floodplain (80% of area)	1	LS	\$1,828	\$1,828

SUB-TOTAL \$88,443

CONTINGENCY 10% \$8,844

**CONSTRUCTION TOTAL \$97,287**

\* This construction cost estimate does not include technical costs for final design and construction observation. Costs are based on 80% preliminary designs.



### ENGINEER'S OPINION OF PROBABLE COST\*

Date: 5/14/2014  
 Project #: 5002.004  
 Project Name: French Gulch Restoration  
 Engineer: M. Barnes, G. Howard, R. Anderson

#### French Creek - Restoration Area 5

Item No.	Description	Estimated Quantity	Unit	Unit Price	Total Cost
501	Taxes, Bonds, and Insurance	1	LS	\$5,000	\$5,000
502	General Requirements	1	LS	\$5,000	\$5,000
503	Mobilization/Demobilization	1	LS	\$5,000	\$5,000
504	Water & Dust Control	1	LS	\$2,500	\$2,500
505	Soil & Erosion Control	1	LS	\$5,000	\$5,000
506	Clearing and Grubbing	0.4	AC	\$7,000	\$2,800
507	Excavation & Embankment - Floodplain Shaping	500	CY	\$5	\$2,500
508	Stream Channel Work	750	LF	\$4	\$3,000
509	Stream Banks - Fabric Wrap (80% of outer bends)	595	LF	\$42	\$24,990
510	Stockpile & Install - Wood Structure (1 per 25' of new channel)	30	EA	\$150	\$4,500
514	Collect - Willow Stakes (4 stakes / Ln. Ft. of streambank)	521	LF	\$5	\$2,345
515	Organic Material/Topsoil - Strip/Stockpile/Place (top 6 inches)	0.4	AC	\$4,000	\$1,600
516	Seed/Mulch - Floodplain Areas	0.12	AC	\$600	\$72
517	Seed - Wetland/Streambank Areas	0.14	AC	\$800	\$112
519	Plant/Install - Streambank (75% of area)	1	LS	\$2,535	\$2,535
520	Plant/Install - Floodplain (80% of area)	1	LS	\$4,222	\$4,222

SUB-TOTAL

\$71,176

CONTINGENCY

10%

\$7,118

**CONSTRUCTION TOTAL****\$78,293**

\* This construction cost estimate does not include technical costs for final design and construction observation. Costs are based on 80% preliminary designs.





### ENGINEER'S OPINION OF PROBABLE COST\*

Date: 5/14/2014  
 Project #: 5002.004  
 Project Name: French Gulch Restoration  
 Engineer: M. Barnes, G. Howard, R. Anderson

#### French Creek - Habitat Improvement Areas

Item No.	Description	Estimated Quantity	Unit	Unit Price	Total Cost
601	Taxes, Bonds, and Insurance	1	LS	\$5,000	\$5,000
602	General Requirements	1	LS	\$5,000	\$5,000
603	Mobilization/Demobilization	1	LS	\$5,000	\$5,000
604	Water & Dust Control	1	LS	\$1,000	\$1,000
605	Soil & Erosion Control	1	LS	\$1,000	\$1,000
606	Clearing and Grubbing	0.2	AC	\$7,000	\$1,400
608	Stream Channel Work	120	LF	\$4	\$480
610	Stockpile & Install - Wood Structure (1 per 25' of new channel)	6	EA	\$150	\$900
611	Stockpile & Install - Large Wood Habitat	6	EA	\$300	\$1,800
613	Stockpile & Install - Pool Habitat	6	EA	\$200	\$1,200
615	Organic Material/Topsoil - Strip/Stockpile/Place (top 6 inches)	0.2	AC	\$4,000	\$800

SUB-TOTAL \$23,580

CONTINGENCY 10% \$2,358

**CONSTRUCTION TOTAL \$25,938**

\* This construction cost estimate does not include technical costs for final design and construction observation. Costs are based on 80% preliminary designs.



### ENGINEER'S OPINION OF PROBABLE COST\*

Date: 5/14/2014  
 Project #: 5002.004  
 Project Name: French Gulch Restoration  
 Engineer: M. Barnes, G. Howard, R. Anderson

#### French Creek - Culvert Removal & Stream Reconnection

Item No.	Description	Estimated Quantity	Unit	Unit Price	Total Cost
701	Taxes, Bonds, and Insurance	1	LS	\$5,000	\$5,000
702	General Requirements	1	LS	\$5,000	\$5,000
703	Mobilization/Demobilization	1	LS	\$5,000	\$5,000
704	Water & Dust Control	1	LS	\$2,500	\$2,500
705	Soil & Erosion Control	1	LS	\$5,000	\$5,000
706	Clearing and Grubbing	0.2	AC	\$7,000	\$1,400
707	Excavation & Embankment - Floodplain Shaping	100	CY	\$5	\$500
708	Stream Channel Work	75	LF	\$4	\$300
709	Stream Banks - Fabric Wrap (80% of outer bends)	61	LF	\$42	\$2,562
712	Stockpile & Install - Step Feature	7	EA	\$500	\$3,500
714	Collect - Willow Stakes	75	LF	\$15	\$1,125
715	Organic Material/Topsoil - Strip/Stockpile/Place (top 6 inches)	0.2	AC	\$4,000	\$800
722	Culvert Removal & Disposal	1	LS	\$5,000	\$5,000

SUB-TOTAL \$37,687

CONTINGENCY 10% \$3,769

**CONSTRUCTION TOTAL \$41,456**

\* This construction cost estimate does not include technical costs for final design and construction observation. Costs are based on 80% preliminary designs.



**MORRISON  
MAIERLE, INC.**

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Missoula, Montana 59808      Fax: (406)-542-4801

### ENGINEER'S OPINION OF PROBABLE COST\*

Date: 5/14/2014  
 Project #: 5002.004  
 Project Name: French Gulch Restoration  
 Engineer: M. Barnes, G. Howard, R. Anderson

#### French Creek - Project Total

Description					Total Cost
	<b>Restoration Area 1</b>				
	Sub-Total				\$203,481
	Contingency				\$20,348
	<b>Restoration Area 2</b>				
	Sub-Total				\$400,968
	Contingency				\$40,097
	<b>Restoration Area 3</b>				
	Sub-Total				\$29,164
	Contingency				\$2,916
	<b>Restoration Area 4</b>				
	Sub-Total				\$88,443
	Contingency				\$8,844
	<b>Restoration Area 5</b>				
	Sub-Total				\$71,176
	Contingency				\$7,118
	<b>Habitat Improvement Areas</b>				
	Sub-Total				\$23,580
	Contingency				\$2,358
	<b>Culvert Removal and Stream Reconnection</b>				
	Sub-Total				\$37,687
	Contingency				\$3,769

Σ SUB-TOTAL \$854,499

Σ CONTINGENCY \$85,450

**Σ CONSTRUCTION TOTAL \$939,949**

\* This construction cost estimate does not include technical costs for final design and construction observation. Costs are based on 80% preliminary designs.



# memo

**TO:** Jim Olsen, MT FWP  
**FROM:** Russ Anderson, PE, CFM & Matt Barnes, EI  
**DATE:** February 5, 2014  
**JOB NO.:** 5002.004  
**RE:** French Gulch Restoration: Hydraulic and Geomorphologic Analysis  
**CC:** File

☐ Urgent     
 ☐ For Review     
 ☐ Please Comment     
 ☐ Please Reply     
 ☒ For Your Use

This memo presents the results of the geomorphologic and hydraulic analyses performed on French Gulch in Deer Lodge County, Montana. The reach investigated was identified by Montana Fish, Wildlife & Parks (FWP) for restoration from past mining activities. Morrison – Maierle, Inc. (MMI) performed reach level geomorphological reconnaissance and strategic topographical survey to identify specific restoration locations and to quantify restoration design parameters.

## Geomorphology

MMI performed site reconnaissance on the reach of French Gulch that was identified for restoration during the fall of 2013. During this time the upper reaches of the project were inundated with snow and ice covering the stream channel. This precluded gathering geomorphologic data in this section however topographical data was surveyed. Sections of the reach that were accessible are identified both qualitatively and quantitatively as one of the following categories:

- Priority 1 – highly impacted and degraded section. These sections exhibit observational and measurable signs of degradation from past mining material wasting, straightening, and other consequential impacts like bimodal substrate and lack of accessible floodplains.
- Priority 2 – moderately impacted section with various degrees of degradation. Passive restoration techniques and improvement of adjacent sections likely to succeed in improving aquatic habitat and fluvial functioning.
- Priority 3 – inaccessible section identified as moderately impacted in localized sections surrounded by functioning sections. Minimal and localized restoration of impacted sections likely required. Impacted section identified using parameters from topographic data like sinuosity, belt width, and entrenchment ratio.
- Reference – this section was identified as having little to no impacts or degradation. This section exhibits typical geomorphologic values for this stream type. Measured values in this section are used to quantify the degree of degradation in impacted sections and to provide design parameters for restoration.

The table below shows the parameters that have been used to quantify degradation between Priority 1 and Reference sections. Other priority sections exhibit average values between those shown.



Geomorphic Section Comparison*				
	Section ID:			
	Priority 1	Reference		% Difference
Gradient:	0.0225	0.0176	ft/ft	28%
Sinuosity:	1.14	1.50	ft/ft	24%
Bankfull Width:	7.9	5.9	ft	32%
Floodprone Width:	22	53	ft	59%
Entrenchment Ratio:	2.20	4.84		55%
Width/Depth Ratio:	21.3	20.7		3%
% Pools:	12.0	50.5	%	76%
Res. Pool Depth:	0.50	0.63	ft	20%
Pool Length:	6.0	13.6	ft	56%
Pool Width:	6.5	7.1	ft	8%
Pool-Pool Spacing:	40	29	ft	37%
Radius:	90	14	ft	548%
Meander Length:	224	49	ft	356%
Belt Width:	41	88	ft	53%
Substrate D <sub>15</sub> :	1.0	2.6	mm	62%
Substrate D <sub>50</sub> :	17.3	25.8	mm	33%
Substrate D <sub>84</sub> :	85.3	82.2	mm	4%
Large Woody Debris:				
# per 100' =	1	4		74%
Avg Length =	5.0	4.2	ft	19%
Avg Dia =	0.8	0.9	ft	7%
*Note: Average values used for comparison				

Using the average parameter values recorded during field reconnaissance the reference reaches of French Gulch have been categorized using the Wildland Hydrology stream type system. The reach from the MT Hwy 569 crossing to the confluence with First Chance Creek most closely fits a C3 stream type. The reach from the confluence of First Chance Gulch to the upstream limit of this project most closely fits a B3 stream type.

For restoration design purposes these categorizations indicate that the parameter values are expected vary across these reaches. Some typical expectations when moving from below the confluence of First Chance Creek to above would be

- Increased average slope
- Slightly reduced entrenchment
- Slightly reduced sinuosity

- Reduce belt width
- Increased meander length
- Reduced entrenchment ratio

### Hydrology

The area in French Gulch above its crossing Montana State Highway 569 drains an area approximately 6.56 square miles delineated on USGS quad maps that have been geo-referenced onto the Montana State Plane NAD 83 coordinate system. First Chance Creek is the one significant tributary to French Gulch in the project reach. Its confluence is approximately 0.66 miles upstream of the MT Hwy 569 crossing. The French Gulch basin area above the confluence is 4.71 square miles. USGS regression equations (Parrett & Johnson, 98) for the Southwest region of MT were used to calculate flowrates for annual probabilities of 50% to 4% (Q2 to Q100) as shown in the table below. The weighted average of regression equations based on basin characteristics and bankfull channel widths was used.

French Gulch Flowrates		
Annual Probability	Below confluence with 1 <sup>st</sup> Chance Creek	Above confluence with 1 <sup>st</sup> Chance Creek
50%	14 cfs	12 cfs
10%	53 cfs	48 cfs
4%	85 cfs	75 cfs

### Hydraulics

The hydraulic program WinXSPRO Version 3.0 was used to analyze stream cross sections surveyed in areas identified for restoration and areas of reference conditions. Analysis of these cross sections was used to calculate entrenchment ratios and width-to-depth ratios. Sediment transport analysis will be performed during restoration design using these cross sections to estimate sediment transport continuity through areas of channel and floodplain restoration.



# memo

**TO:** Jim Olsen – Montana Fish Wildlife and Parks  
**FROM:** Greg Howard – Sr. Environmental Scientist  
**DATE:** 05/07/14  
**JOB NO.:** 5002.004  
**RE:** Summary of Wetland Findings and Permitting  
**CC:** Russ Anderson

☐ Urgent      ☒ For Review      ☐ Please Comment      ☐ Please Reply      ☐ For Your Use

## INTRODUCTION

Morrison-Maierle, Inc. (Morrison-Maierle) was contracted by Montana Fish, Wildlife, and Parks (FWP) to prepare a conceptual plan consisting of an 80% design package for the restoration of French Creek and its associated floodplain / wetland area.

The project site is located on FWP property within the Mount Haggin Wildlife Management Area (WMA). French Creek is located in the general area identified as French Gulch. The project areas are separated into several restoration areas along French Gulch and these areas are illustrated on the project drawings. A design package has been prepared for the project and includes conceptual plan with design drawings, construction specifications, and cost estimate.

The sites are located on Lincoln Gulch, MT 7.5 minute U.S. Geological Survey (USGS) topographic quadrangle at the following legal description: Section 1, Township 2 North; Range 12 West, and Section 5 and 6, Township 2 North, Range 11 West. For project location refer to *French Creek Restoration in French Gulch Conceptual Plan* (referred to as design drawings) – Drawing Number G-0. Map G-2 in the design drawings illustrates the different restoration reaches proposed for the project.

The FWP is applying for a Reclamation and Development Grant (RDG) through the DNRC to fund the proposed project. The objectives of the project include the following:

- Reconstruction of French Creek stream channel to restore stream channel, floodplain, and valley function;
- Re-grading of adjacent floodplain areas to restore connectivity to the stream channel and provide wetland areas;
- Creation of wetlands within the constructed floodplain zone;
- Localized stream habitat augmentation at specified locations;
- Realignment of the French Gulch Road to remove it from the floodplain and its influence on the stream channel;

- Smoothing and removal of specified existing mine waste piles to blend with existing topography;
- Design revegetation specifications and weed control plan for the project area.

This technical memo describes information regarding areas of wetland and waters of the U.S. observed at the two restoration sites and considered aquatic resources. These findings have been utilized to determine preliminary permitting requirements for section 404 of the Clean Water Act (CWA). The proposed work and associated activities of restoration, establishment and enhancement can be permitted under a Nationwide Permit 27 (NWP 27).

This technical memo provides a summary of wetland characteristics observed during mapping. In addition, addresses permitting requirements, and associated acreage summary for restoration areas, wetland / WOUS impacts, and net gain in aquatic resources.

Mapping efforts in general were conducted using a reconnaissance level survey. The level of detail included mapping of the wetland / WOUS boundaries with resource-grade GPS unit following vegetation and hydrology indicators. The methods section describes in more detail the methodology and rationale used for this project.

Morrison-Maierle completed an 80% design for inclusion with the grant application. The project did not warrant a full delineation at this point in grant application process. Timing of the field visit also influenced the level of detail. Wetland mapping and data was used prepare the design drawings; determine impacts and net gains of aquatic resources. This information is presented in the proceeding results section.

## METHODS

Morrison-Maierle completed a reconnaissance level mapping of wetlands and WOUS in the project area. These areas were mapped to determine design and permitting related activities. Restoration Areas RA 1 and RA 2 were the only sites mapped for the project.

Wetlands within the proposed project areas were mapped during November 2013. Wetland / WOUS boundaries were captured using resource-grade hand held GPS unit. The reconnaissance level mapping was due to the timing of the field visit, which was outside the acceptable delineation window. The majority of vegetation was still identifiable to capture a preliminary wetland boundary. The WOUS boundaries were determined based on the ordinary high water mark (OHWM) along French Creek. These boundaries were identifiable during the mapping based on evidence of hydrology indicators and active hydrology.

In many locations along the French Gulch corridor the boundary of the wetlands / WOUS was determined by topographic break between low-lying waterways and adjacent spoil piles from historic placer mining in the drainage. This is especially true along a majority of the existing French Creek waterway in Restoration Area 1 confined by the spoils.

Wetland / WOUS boundaries are illustrated on the design drawings. These boundaries were used to determine the new channel and floodplain alignment.



## RESULTS

A total of 9.40 acres of wetlands were mapped within Restoration Areas RA 1 and RA 2 during November, 2013 field visit. The reconnaissance mapping focused on Restoration Areas RA 1 and RA 2, which were the only sites that were accessible during the field visit in November. The sites consist of wetlands dominated by wet shrubs with pockets of open wetland meadows consisting of herbaceous vegetation. Five wetland areas were mapped at the site and characteristics summarized in Table 1. Refer to Figure 1 for a map illustrating wetland and WOUS boundaries for these areas. Figure 1 has been provided and illustrates wetlands/ WOUS areas mapped for the project. In addition, these boundaries are also illustrated on design drawings, G-1 to 4.

**Table 1. Wetland Characteristics.**

Restoration Area	Wetland Id	Acres	Sq. Ft.	HGM Classes	Cowardin Classes	Jurisdictional Status
RA 1	W-1	7.33	319,295	Riverine, Sloped	Scrub-shrub, Emergent, Aquatic Bed	Likely Jurisdictional
RA 1	W-2	0.39	16,988	Depressional, sloped	Scrub-shrub, Emergent	Likely Jurisdictional
RA 1	W-3	0.36	15,682	Depressional, sloped	Scrub-shrub, Emergent	Likely Jurisdictional
RA 2	W-4	0.33	14,375	Riverine, Depressional	Scrub-shrub, Emergent	Likely Jurisdictional
RA 2	W-5	0.98	42,689	Riverine, Depressional	Scrub-shrub, Emergent	Likely Jurisdictional
	<b>TOTAL:</b>	<b>9.40</b>	<b>409,028</b>			

**Vegetation.** The wetland areas consist of a mixture of shrubs and herbaceous vegetation. These areas are classified as scrub-shrub and emergent vegetation types. Shrub species are dominated by Geyer's willow (*Salix geyeriana*), Drummond's willow (*Salix drummondiana*), Booth's Willow (*Salix boothii*), speckled alder (*Alnus incana*), red-osier dogwood (*Cornus stolonifera*), and water birch (*Betula occidentalis*). The herbaceous species were dominated by sedge (*Carex* spp.), Nebraska sedge (*Carex nebrascensis*), bluejoint reedgrass (*Calamagrostis canadensis*), spreading bent (*Agrostis stolonifera*), Baltic rush (*Juncus balticus*) and large-leaf avens (*Geum macrophyllum*). Several upland islands exist within the mapped wetland boundary in RA 1. These upland island areas are dominated by overstory of tree species including lodgepole pine (*Pinus contorta*), Douglas-fir (*Pseudotsuga menziesii*), and understory of shrubs including creeping juniper (*Juniperus horizontalis*), red bearberry (*Arctostaphylos uva-ursi*) and mountain ninebark (*Physocarpus monogynus*). Upland vegetation surrounding the wetland varies based on locations in the French Gulch. The lower segment has areas of sagebrush / grasslands that transitions into conifer forest as you move up the drainage.

**Hydrology.** Primary wetland hydrology indicators were observed throughout all areas identified as wetlands during fieldwork in November 2013. These included surface water inundation, saturated soils to the ground surface, and drainage patterns in the wetlands.

## ACREAGE SUMMARY

This section describes the acreage summary for the proposed restoration efforts and associated impacts to existing aquatic resources. Impacts areas were determined during the preliminary design and assessment based on mapping efforts. Impacts included areas of wetland that will be disturbed during the construction of the new French Creek channel. The proposed design for Restoration Areas RA 1 includes abandoning the existing channel and re-routing French Creek through a newly constructed channel / floodplain that flows north around the existing spoils.

Refer to the attached design drawings for stream layout and cross-sections of the proposed restoration areas. The current channel overtime has become incised and unable to migrate due to these adjacent mine spoils that hinder any natural migration of the channel and floodplain. The proposed restoration concept includes moving the channel to the north that will allow the development of new channel and adjacent floodplain/wetland.

The restoration strategy includes creating a new channel through areas of existing wetlands. These existing wetlands at its current ground surface elevation would be constructed as the new elevation for the floodplain of the creek. Restoration concepts include both minimal and extensive channel improvements. Minimal improvements include excavated channel with no geotextile work and channel is stabilized from existing grass sod banks and substrate. The more extensive channel improvements include a bio-engineered bank using geotextile fabric and willows cuttings to construct soil lifts and new banks.

A portion of the impacts include converting emergent wetland areas to a different class such as a stream channel. In addition, areas of wetland will be graded to develop floodplain adjacent to the new channel. This requires some of these areas to be filled to match ground surface elevation with proposed stream channel.

The following table (Table 2) lists the proposed area of establishment for floodplain / wetland, wetland / stream impacts, and creation (establishment) of new wetlands areas all calculated from the preliminary design.

**Table 2. Acreage Summary for Proposed Restoration Efforts.**

Restoration Area	Proposed Floodplain (Acres)	Wetland / Stream Impacts (Acres)	Restoration / Creation Areas (Acres)
RA 1	1.7	0.78	0.92
RA 2	1.8	0.34	1.51
<b>Total</b>	<b>3.5</b>	<b>1.12</b>	<b>2.38</b>

Restoration Area RA1 is proposed to have approximately 1.7 acres of floodplain developed in association with approximately 1,900 linear feet of reconstructed stream channel. Within the floodplain area 0.78 acres of existing wetland area may likely be impacted for the restoration efforts. The restoration efforts will develop an overall net increase of 0.92 acres of potential floodplain/wetland areas. These efforts are also expected to increase the function and values of project. Function and values ratings would likely improve for vegetation classes, habitat creation, and sediment and nutrient control for water quality.

Restoration Area RA 2 is proposed to have approximately 1.8 acres of floodplain development in association with 4,300 linear feet of reconstructed stream channel. Within the floodplain area 0.34 acres of existing wetland area may likely be impacted for the restoration efforts. The restoration efforts will develop an overall net increase of 1.51 acres of potential wetland and floodplain areas. These efforts are also expected to increase the function and values of project.

Permitting for the Section 404 regulations will use a Nationwide Permit 27 (NWP 27) – *Aquatic Habitat Restoration, Establishment, and Enhancement Activities*. The NWP 27 allows for impacts to existing wetlands provided the project shows a net gain in aquatic area and functions. Restoration Areas RA 1 and 2 are expected to have a net increase in acreage of aquatic resources. A spec sheet and checklist for NWP 27 has been included with this memo for future reference.

Overall the proposed restoration in RA 1 and 2 would restore / establish 1.12 acres and gain 2.38 acres for a total of 3.5 acres of aquatic resources for the project.

#### REQUIREMENTS FOR COMPLETION

The following brief outline has been prepared to describe items that will be required for final submittal of the project. These items need to be completed and submitted to finalize the permit for the Section 404, CWA under the jurisdiction of the Army Corps of Engineers. If the project is approved for the grant the following items will need to be completed for inclusion with the permit application:

- Montana Joint Application;
- Official Wetland Delineation of Aquatic Resources – Routine Wetland Data forms and data will be collected for wetland within the proposed path of construction; and
- Functional Assessment of Wetland Areas.

#### SUMMARY

In summary the following findings are presented:

- Wetland / WOUS were mapped within the project area and totaled 9.40 acres;
- Mappings was complete using reconnaissance level survey to determine boundaries;
- The project will have impacts to wetland/ WOUS, but the proposed design will ultimately have a net gain in aquatic resources at the site; and
- A NWP 27 may be used to permit this project under Section 404, CWA regulations.